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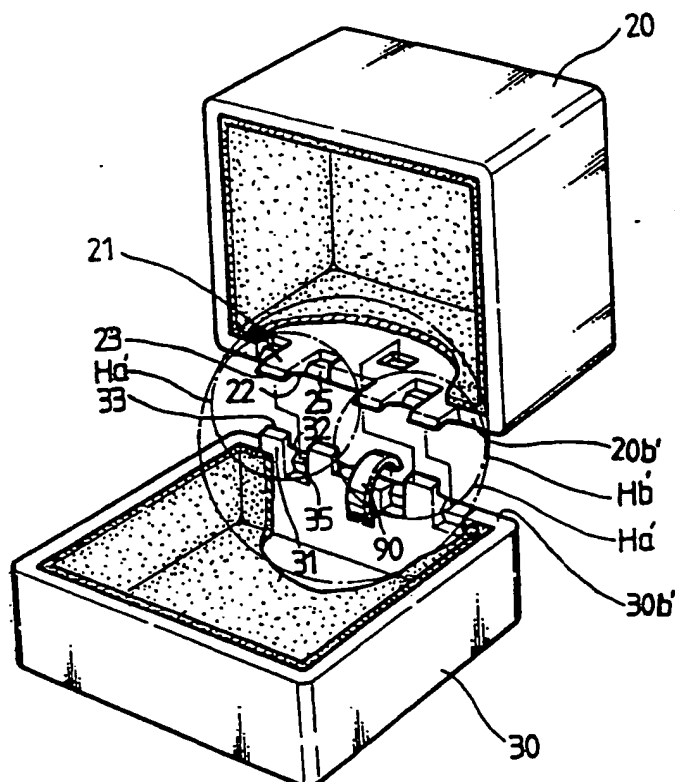


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/KR90/00004 <b>(22) International Filing Date:</b> 31 May 1990 (31.05.90)  <b>(30) Priority data:</b> 1989/7494                      31 May 1989 (31.05.89)                      KR 1990/7480                      23 May 1990 (23.05.90)                      KR  <b>(71)(72) Applicant and Inventor:</b> JEONG, Chang, Rok [KR/KR]; 210-14, Seongsu 2-ga 4-dong, Seongdong-ku, Seoul 133-124 (KR).  <b>(74) Agent:</b> LEE, Young, Pil; 2nd Floor, Cheonghwa Bldg., 1571-18, Seocho-dong, Seocho-ku, Seoul 137-073 (KR).	<b>(81) Designated States:</b> AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH (European patent), CM (OAPI patent), DE (European patent)*, DK (European patent), ES (European patent), FI, FR (European patent), GA (OAPI patent), GB (European patent), HU, IT (European patent), JP, KP, LK, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL (European patent), NO, RO, SD, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.  Published With international search report.	

**(54) Title:** ARTICLE INTEGRALLY FORMED WITH HINGE**(57) Abstract**

An article, e.g., a jewel box comprising a first member and a second member which are separately formed to be folded and unfolded by rotating of one member relative to the other member about an axis of hinge wherein the hinge comprises protrusions and recesses formed alternately and integrally with the first member and recesses and protrusions formed alternately and integrally with the second member such that the respective protrusions and recesses of the first member correspond to and conform with the corresponding recesses and protrusions of the second member. Said protrusions and the corresponding recesses have respective inclined planes adapted to contact each other. Said hinge further comprises a biasing means for resiliently fastening said two members. The hinge portion of the article is simple and stable in structure, easy and low cost consuming in manufacturing.



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## ARTICLE INTEGRALLY FORMED WITH HINGE

Field of the Invention

The present invention relates to an article integrally  
5 formed with hinge.

Background of the Invention

There are various kinds of articles requiring hinge from  
small jewel boxes, fountain pen cases to doors of building.  
10 Among them, a conventional jewel box illustrated in FIG. 1A  
comprises a body 3 and a cover 2 which are hingedly connected  
to each other by a hinge 1 to be pivotably opened and closed.  
Said hinge 1 consists of parts separately formed from the  
body 3 and cover 2. Thus, the hinge should be attached to  
15 the body and the cover by means of usual fasteners such as  
nails or screws.

This type of article comprising separable hinge and  
fastener require a lot of time and labor in manufacturing and  
assembling to raise the manufacturing cost.

20 Another conventional jewel box illustrated in FIG. 1B  
comprises a body 3 and a cover 2 each of which is provided  
with a pair of protruded knuckles 6,6, 5 and 5 integrally  
formed with the body and the cover wherein the body 3 and the  
cover 2 are to be hingedly connected to each other by  
25 interdigitating the knuckles 6, 6, 5 and 5 of the body 3 and  
cover 2 with a pair of pins 4,4. In this kind of jewel box,  
the knuckles protrusively formed in the body and the cover  
harm external appearance. Further, the knuckles are readily  
destructive due to the pin holes 7 formed therein.

30

Summary of the Invention

Therefore, the object of the invention is to provide an  
article comprising two separate members to be folded and  
unfolded by means of a hinge which are simple and stable in  
35 structure, easy and low cost consuming in manufacturing.

To accomplish the object of the present invention, the article according to the present invention comprises a first member and a second member which are separately formed to be folded and unfolded each other by rotating of one member relative to the other member about an axis of hinge wherein the hinge comprises protrusions and recesses formed alternately and integrally with the first member and recesses and protrusions formed alternately and integrally with the second member such that the respective protrusions and recesses of the first member correspond to and conform with the corresponding recesses and protrusions of the second member. Said respective protrusions and the corresponding recesses have inclined planes adopted to contact each other. Said hinge further comprises a biasing means for resiliently fastening said two members.

The foregoing and other objects and advantages will become more apparent to those skilled in the art upon an understanding of the preceding text and the drawings and explanations following including description of preferred embodiments, all being given as only exemplary and not by way of limitation.

#### Brief Description of the Drawings

Figs. 1A and 1B are perspective views of conventional jewel boxes.

Fig. 2 is an exploded perspective view of a jewel box embodying the present invention.

Fig. 3 is an extracted view of the jewel box of Fig. 2 for more clearly illustrating the hinge portion thereof.

Fig. 4 is a sectional view of the jewel box of Fig. 3 wherein the jewel box is illustrated as being opened in full extent.

Fig. 5 is an exploded perspective view of another embodiment of an jewel box according to the present invention.

Fig. 6 is an extracted view of the jewel box of Fig. 5 for more clearly illustrating the hinge portion thereof.

Fig. 7A is a sectional view of the jewel box of Fig. 6 wherein the jewel box is illustrated as being closed in full extent.

Fig. 7B is a sectional view of the jewel box of Fig. 6 wherein the jewel box is illustrated as being opened in full extent.

The jewel box illustrated in Fig 2 comprises a body 30 and a cover 20 having hinge portion Hb integrally formed therein and a C-shaped plate spring 90. The body 30 has front and back walls 30a and 30b and left and right walls 20c and 20d. The body 30 has a bottom wall 30e and an opening 30f at its top. The cover 20 is formed in a similar manner to the body 30. The body 30 and the cover 20 are respectively covered with linings 30h and 20h over the internal surfaces thereof. A plurality of protrusions 31 and 21 and recesses 35 and 25 are alternately and integrally formed with both the back walls 30b and 20b at the end planes 30b' and 20' thereof such that each protrusion of body 30 is formed to conform with the corresponding recess of the cover 20 and each protrusion of the cover 20 is formed in a similar manner. A C-shaped plate spring is provided at the hinge portion of the box to make the body 30 and cover 20 engaged with each other and to ensure to resilient opening and closing of the box.

More detailed description of the hinge portion Hb of the box is provided below with reference to Fig. 3. On the respective end planes 30b' and 20b' of the back walls 30b and 20b of the body 30 and the cover 20, there are provided a pair of unit hinges Ha and Ha spaced apart from each other for constituting the whole hinge portion Hb by forming a plurality of protrusions and recesses positioned alternately in such a manner as described above. Each protrusion 31 of the body 30 is shaped to have an approximately 45° inclined plane 32 facing exterior of the body and right and left

plane vertically extending from each edge of the inclined plane. The corresponding recess 25 of the cover 20 is shaped to have an inclined plane 25a facing interior of the cover as well as right and left planes at each edge of the inclined plane 25a so as to respectively conform and contact with the counterparts of the protrusion of the body 30. Each protrusion 21 of the cover 20 and the corresponding recess of 35 of the body 20 is shaped in similar manners as described above for the protrusion 31 and the recess 25.

Further, a C-shaped plate spring is releasably attached to the body 30 and the cover 20 between the unit hinges such that two ends of the spring 90 is engaged with the holes 39 and 29 provided in the body 30 and the cover 30 respectively. Accordingly, the plate spring 90 fastens the body 30 and the cover 20 to enable the jewel box to be resiliently opened and closed, and limits the opening angle of the cover 30.

In the jewel box as constructed above, when the cover 30 is closed upon the body due to the biasing force of the spring 90, the respective end planes of the walls of the body 30 is to contact with the corresponding end planes of the walls of the cover 20 so that the inclined planes 32 and 22 of the protrusions 31 and 21 respectively contact with the corresponding inclined planes 25a and 35a of the recesses 25 and 35. Thus, the right and left planes of the protrusions do not extrude from the external surface of the box.

On the other hand, to open the cover 30 as illustrated in Fig. 4, the cover is rotated about an revolving axis RA made by the contacting line of the top edges 36 of the recesses 35 of the body 30 and the bottom edges of the protrusions 21 of the cover 20. However, the rotating angle of the cover should be limited within approximately 90°. If the rotating angle of the cover is beyond 90°, the engagements between the side planes of the protrusions 31 and 21 and the side planes of the corresponding 25 and 35 are broken because the relative angle between the inclined planes

of the protrusion and recess having 45° inclinations become over 90°. Thus minute relative movement along the revolving axis RA between the body 30 and the cover 20 could occur in case where an excessive external force overwhelming the engaging force of the spring is applied along the revolving axis RA. Accordingly, the possible misalignment of the body 30 and the cover 20 due to the relative movement between them prevent closing of the cover.

However, articles constructed in such a manner as described above can be practically used without any problem for small jewel boxes which do not need to be opened beyond 90° or do not receive any excessive external force normally.

Meanwhile, depending on the usage of the article, there are required articles wherein one member such as the cover in a jewel box can be opened over 90° bringing no problems at all.

The second embodiment described below will meet the requirements.

Fig. 5 to 7B illustrate another jewel box which is a little modified from and common in basic construction with one shown in Figs. 2 to 4.

As shown in the Figures, the hinge portion Hb' of the jewel box consists of a pair of unit hinges Ha' and Ha' which comprise protrusions and recesses integrally formed with the body 30 and the cover 20 as in the first embodiment. Extended jaws 33 and 23 are respectively extended from near the end portions of the protrusions 31 and 21 of the body 30 and the cover 20. Similarly, deeper recesses 27 and 37 are formed at near the bottom end portions of the recesses 25 and 35 of the cover 20 and the body 30 which are adapted to matingly receive the corresponding jaws 33 and 23 of the protrusions 31 and 21. The top edges 36 and 26 of the recesses 35 and 25 are formed to be substantially in the end planes 30b' and 20b' of the back walls 30b and 20b. The protrusions thus do not reveal to exterior of the box when



th cover is fully closed. Further, the line formed by th intercontacting of the top edges 36 and 26 of the recesses and the bottom edges 22 and 32 of the protrusions 21 and 31 can serve as revolving axis of the cover. While, a C-shaped  
5 plate spring 90 is releasably attached to the body 30 and the cover 20 to resiliently fasten the body and the cover.

The second embodiment of the jewel box as constructed above provides wider opening angle of the cover 20 thereof than that in the first embodiment, i.e., more than 90°. As  
10 illustrated in Fig. 7A, when the cover 30 is closed, the protrusion 21 of the body having the extended jaw 23 extended therefrom is to contact throughout the inner surface thereof with the corresponding recess 35 having deeper recess 37. While, in case where the cover is rotated about the revolving  
15 axis RA to be fully opened as illustrated in Fig. 7B, the opening angle of the cover 20 can be over 90°. When the cover is fully opened, the extended jaw 23 of the cover 30 overlaps the adjacent extended jaw 33 of the body 20 so that the jaws 23 and 33 engage each other against an external  
20 force possibly applied along the revolving axis RA. Accordingly, the misalignment of the cover and body is effectively prevented.

The maximum opening angle of the cover varies depending upon the respective heights of the extended jaws 23 and 33  
25 from the inclined planes 22 and 32 of the protrusions 21 and 31. The extended jaws 23 and 33 of the protrusions 21 and 31 may be formed at both unit hinges Ha' and Ha' or one of unit hinges.

If at least a pair of extended jaws 23 and 33 are formed  
30 in the body and in the cover, the mutual engagement of the body and the cover along the revolving axis is ensured.

The articles embodying the present invention is quit different from the conventional ones in the respects that th hinge portion thereof is very simply formed, provides good  
35 external appearance of the article and lowers the

manufacturing cost of the article thanks to the simple construction and fewer number of components thereof.

It is repeated that the present invention is not limited to the description and drawings. But, various modifications  
5 may be made in the structure disclosed without departing from the spirit of the invention. Further, the present invention may be applied to various articles. For instance, the hinge portion, which is the characteristic portion of the present invention, may be formed in the circumference frame of the  
10 door.

What is claimed is:

1. An article comprising a first member and a second member which are separately formed to be folded and unfolded by rotating of one member relative to the other member about  
5 an axis of hinge wherein the hinge comprises protrusions and recesses formed alternately and integrally with the first member and recesses and protrusions formed alternately and integrally with the second member such that the respective protrusions and recesses of the first member correspond to  
10 and conform with the corresponding recesses and protrusions of the second member, said respective protrusions and the corresponding recesses having inclined planes adapted to contact each other, said hinge further comprises a biasing means for resiliently fastening said two members.

15 2. The article as claimed in claim 1 wherein at least a pair of the adjacent protrusions of the first member and the second member are provided with respective extended jaws extended from near the end portions thereof and the corresponding recesses of the second member and the first  
20 member are provided with respective deeper recess portions to conform with said jaws whereby when one members are fully unfolded beyond 90° of rotating angle, the relative movement of the first and second members in the direction of axis of the hinge are prevented due to the mutual abutment of the  
25 adjacent jaws of the first and second members.

3. The article as claimed in claim 1 wherein the bottom edges of the inclined planes of the protrusions and the top edges of the inclined planes of the recesses coincide with each other to serve as the revolving axis of the hinge.

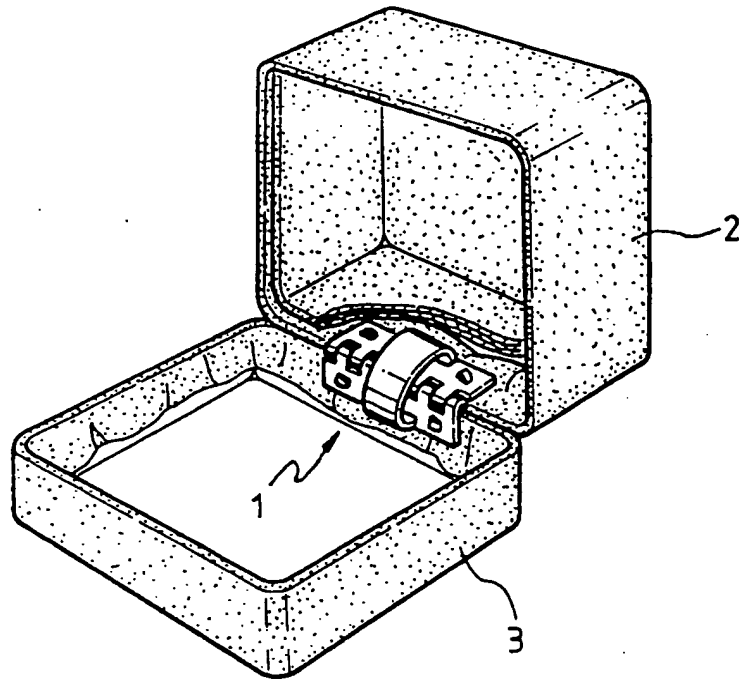
30 4. The article as claimed in claim 1 wherein said biasing means is a C-shaped plate spring.

5. The article as claimed in one of claims 1 to 4 wherein the inclinations of the inclined planes of the protrusions and the inclined planes of the recesses are  
35 approximately 45°.

6. The article as claimed in one of claims 1 to 4 wherein the article is a small box comprising a body and a cover as the first member and the second member.

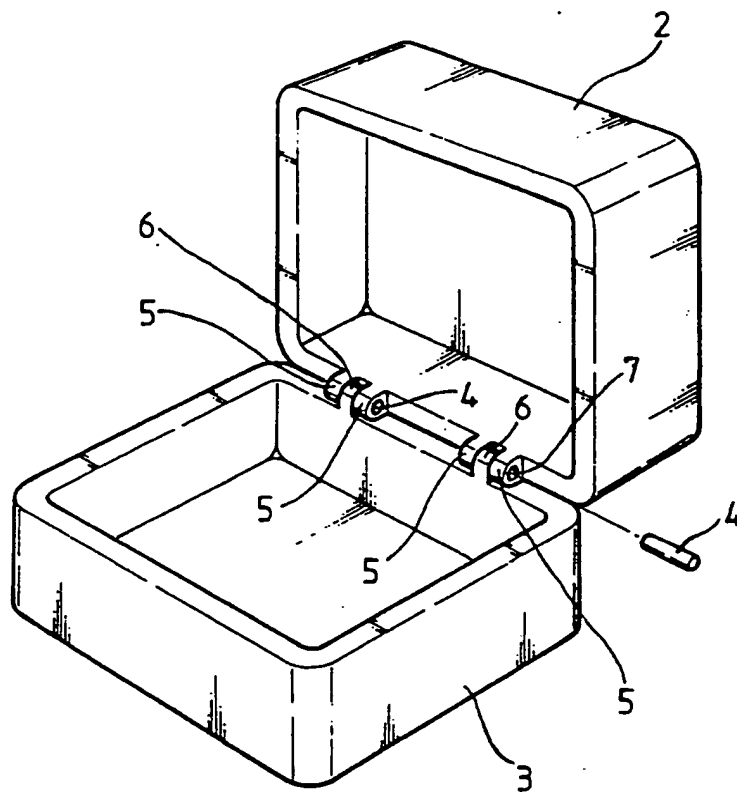
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FIG.1A(Proir Art)



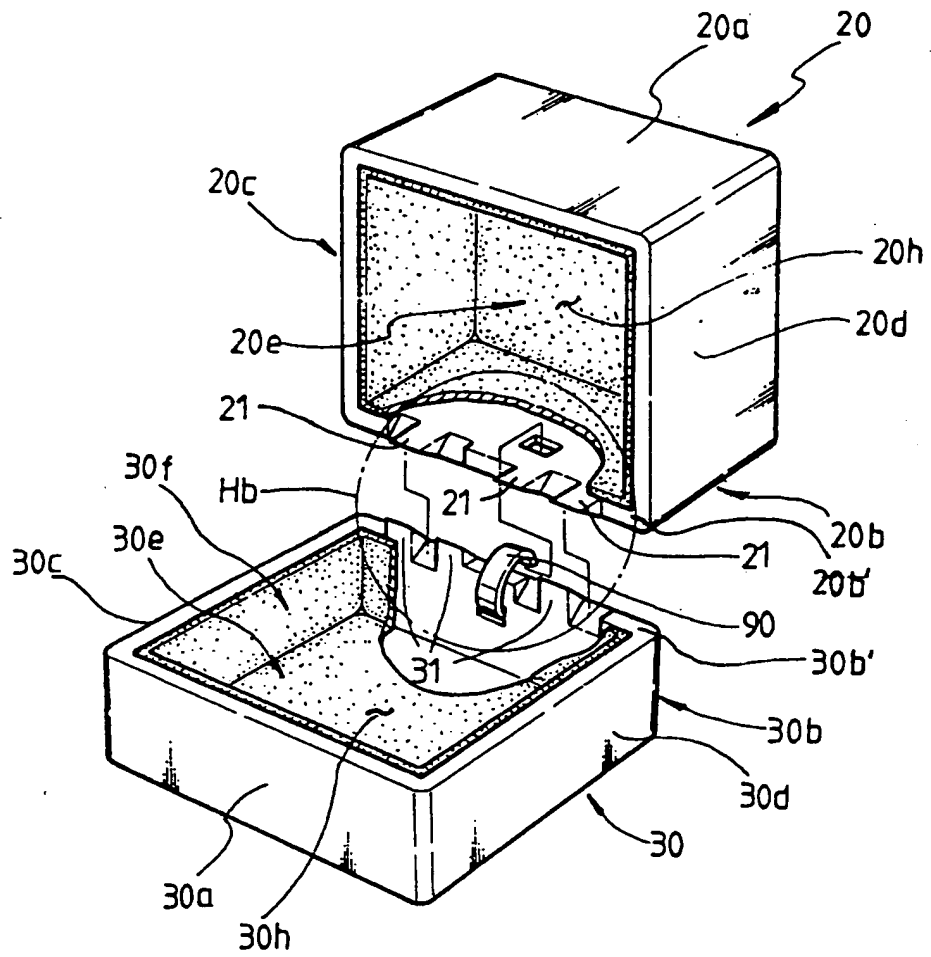
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FIG.1B (Prior Art)



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FIG. 2

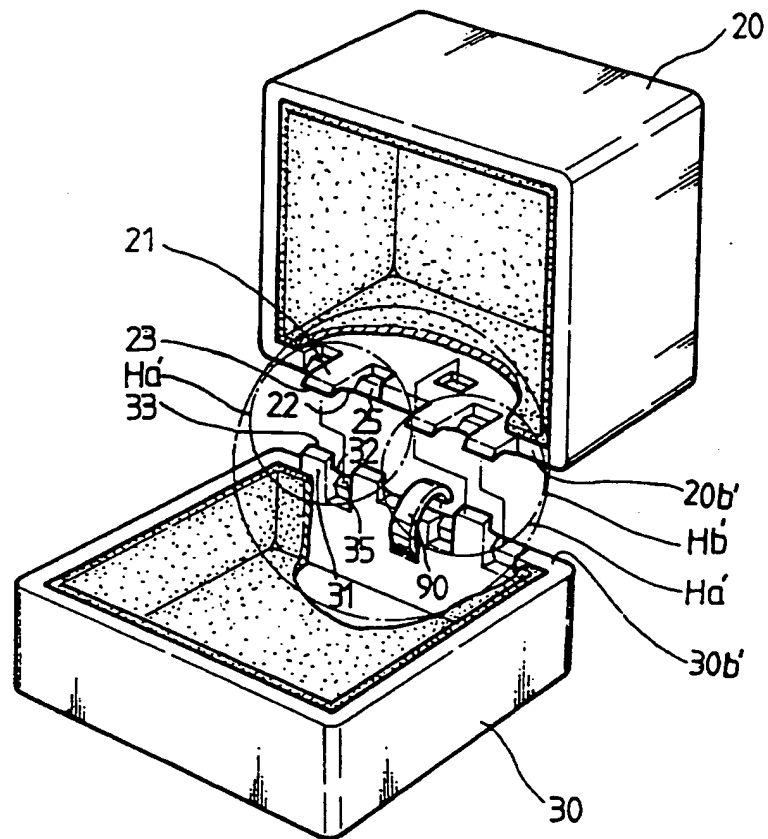






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FIG. 5



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FIG. 6

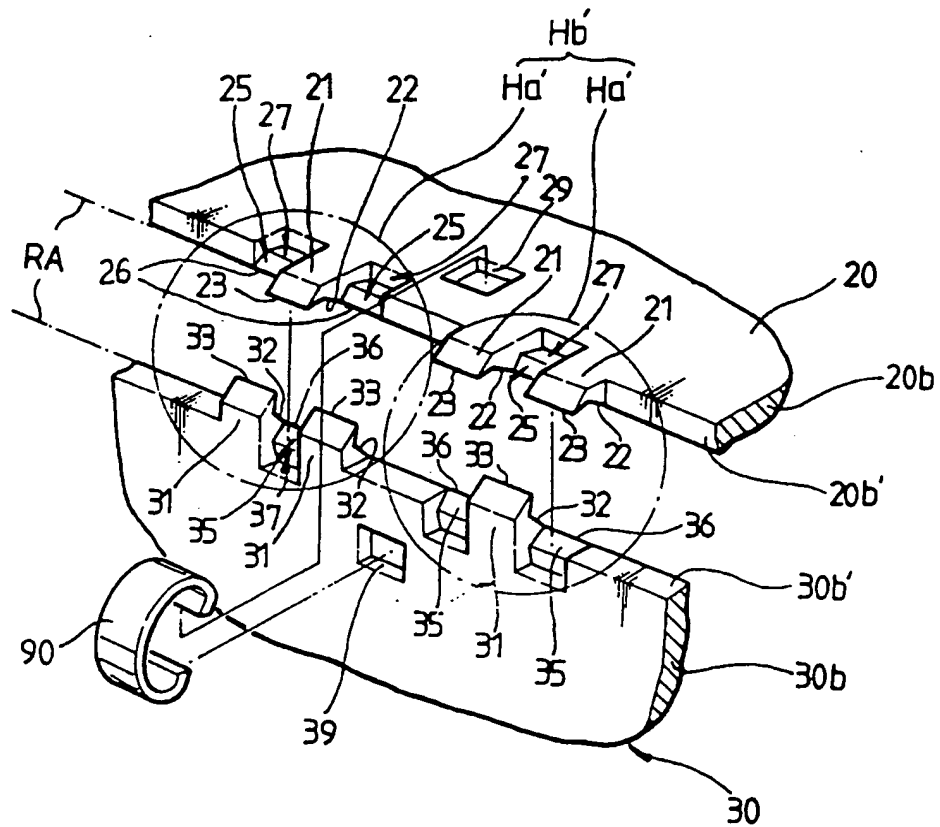


FIG. 7A

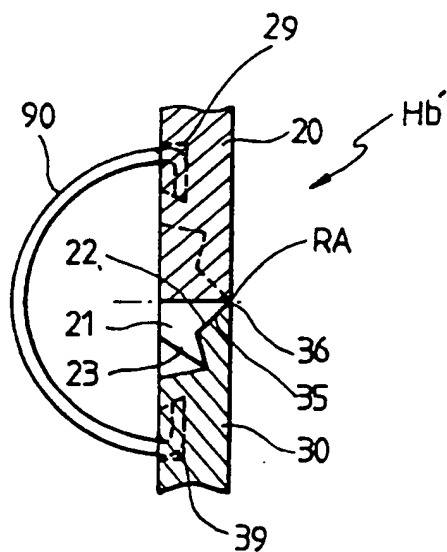
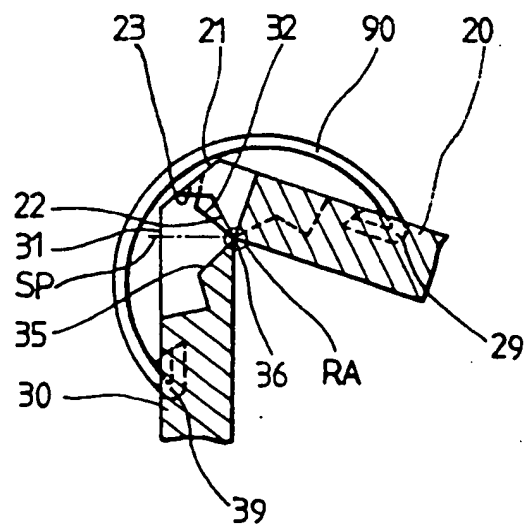


FIG. 7B



# INTERNATIONAL SEARCH REPORT

International Application No PCT/KR 90/00004

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>6</sup> According to International Patent Classification (IPC) or to both National Classification and IPC IPC <sup>5</sup> : E 05 D 1/04, A 45 C 11/00														
<b>II. FIELDS SEARCHED</b> <div style="text-align: center; font-size: small;">Minimum Documentation Searched <sup>7</sup></div> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%; border: none; vertical-align: top;">           Classification System           </td> <td style="border: none; vertical-align: top;">           Classification Symbols         </td> </tr> <tr> <td style="border: none; vertical-align: top;">           Int.Cl.<sup>5</sup>           </td> <td style="border: none; vertical-align: top;">           E 05 D 1/00, 3/00, 5/00; A 45 C 11/00, 13/00         </td> </tr> </table> <div style="text-align: center; font-size: x-small; margin-top: 5px;">           Documentation Searched other than Minimum Documentation            to the Extent that such Documents are Included in the Fields Searched <sup>8</sup> </div>			Classification System	Classification Symbols	Int.Cl. <sup>5</sup>	E 05 D 1/00, 3/00, 5/00; A 45 C 11/00, 13/00								
Classification System	Classification Symbols													
Int.Cl. <sup>5</sup>	E 05 D 1/00, 3/00, 5/00; A 45 C 11/00, 13/00													
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b> <table style="width: 100%; border: none;"> <tr> <th style="width: 10%; border: none; font-size: x-small;">Category <sup>10</sup></th> <th style="width: 60%; border: none; font-size: x-small;">Citation of Document <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup></th> <th style="width: 30%; border: none; font-size: x-small;">Relevant to Claim No. <sup>13</sup></th> </tr> <tr> <td style="border: none; vertical-align: top; text-align: center;">X</td> <td style="border: none; vertical-align: top;">DE, A1, 1 708 218 (GREAT LAKES ALUMINIUM FABRICATORS, INC.) 22 April 1971 (22.04.71), see totality.</td> <td style="border: none; vertical-align: top; text-align: center;">(1,4,5,6)</td> </tr> <tr> <td style="border: none; vertical-align: top; text-align: center;">A</td> <td style="border: none; vertical-align: top;">DE, A1, 2 606 002 (KIENZLE APPARATE GMBH) 18 August 1977 (18.08.77), see totality.</td> <td style="border: none; vertical-align: top; text-align: center;">(1,2)</td> </tr> <tr> <td colspan="3" style="border: none; text-align: center; padding: 10px 0;">           ----         </td> </tr> </table>			Category <sup>10</sup>	Citation of Document <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>	X	DE, A1, 1 708 218 (GREAT LAKES ALUMINIUM FABRICATORS, INC.) 22 April 1971 (22.04.71), see totality.	(1,4,5,6)	A	DE, A1, 2 606 002 (KIENZLE APPARATE GMBH) 18 August 1977 (18.08.77), see totality.	(1,2)	----		
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<div style="font-size: x-small;"> <sup>14</sup> Special categories of cited documents:           <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 48%;"> <sup>15</sup> "A" document defining the general state of the art which is not considered to be of particular relevance  <sup>16</sup> "E" earlier document but published on or after the international filing date  <sup>17</sup> "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  <sup>18</sup> "O" document referring to an oral disclosure, use, exhibition or other means  <sup>19</sup> "P" document published prior to the international filing date but later than the priority date claimed               </div> <div style="width: 48%;"> <sup>20</sup> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  <sup>21</sup> "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step  <sup>22</sup> "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  <sup>23</sup> "Δ" document member of the same patent family               </div> </div> </div>														
<b>IV. CERTIFICATION</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;">           Date of the Actual Completion of the International Search            02 August 1990 (02.08.90)         </td> <td style="width: 50%; border: none; vertical-align: top;">           Date of Mailing of this International Search Report            08 August 1990 (08.08.90)         </td> </tr> <tr> <td style="border: none; vertical-align: top;">           International Searching Authority            AUSTRIAN PATENT OFFICE         </td> <td style="border: none; vertical-align: top;">           Signature of Authorized Officer  </td> </tr> </table>			Date of the Actual Completion of the International Search 02 August 1990 (02.08.90)	Date of Mailing of this International Search Report 08 August 1990 (08.08.90)	International Searching Authority AUSTRIAN PATENT OFFICE	Signature of Authorized Officer 								
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